will encourage attendance at continuation classes during the day, the employer will attach more value to the work of his employees, and the parent will take care that the primary school does not become a wilderness of book-learning.

The difficulties of making this comparison and the devices which have been employed will be apparent to everyone. Of the conclusions that can be drawn, one at least is incontestable: it is not yet possible to give a definite statistical statement because the materials do not exist. It seems bad economy to suggest further advances until the completion of a national stock-taking.

A. J. Pressland.

THE SOUTH-EASTERN UNION OF SCIENTIFIC SOCIETIES.

Under the presidency of Dr. D. H. Scott, F.R.S., the South-Eastern Union of Scientific Societies held an extremely successful congress at Winchester from Wednesday to Saturday of last week. As Sir Archibald Geikie in his presidential address to the congress at Hastings last year had dealt with the geological history of the Weald, Dr. Scott this year appropriately discoursed on the flora of the Wealden strata. This was a subject of peculiar interest to the Union, inasmuch as many of the most interesting fossil plants of Wealden age have been obtained within the sphere of its activity. The flora was of similar type to that which had prevailed from the beginning of the Mesozoic period, and in so far as seed-bearing plants are concerned consisted chiefly of conifers and cycads. It is believed that the angiosperms did not appear until later Cretaceous times, and their comparatively sudden rise was probably related to the contemporary development of insect life.

With a living specimen of *Cycas revoluta* in front of him, and aided by a fine series of lantern-slides, Dr. Scott described the structure of recent cycads and their relation to the fossil types. Before dealing with cycads, however, he referred to the fact that in the Secondary flora there were many plants more or less related to the Ginkgo, or maiden-hair tree, which at the present day survives as an isolated species, possibly wild on the mountains of western China. It was discovered by Japanese botanists that cycads and Ginkgo alone among living seed-plants were fertilised, like ferns, by motile cells, or spermatozoids. Misled by the resemblance of the leaves of the African cycad Stangeria to the fronds of a fern, the systematic position of Stangeria was at one time misunderstood. It is interesting to learn from Palæozoic botany that a real affinity exists between the cycads and the ferns.

During the Jurassic and Wealden stages of the earth's history cycadaceous plants were so abundant and varied that probably among vascular plants one in every three was a cycad, whereas at the present day the proportion scarcely reaches one in a thousand. Although cycads have now a very limited geographical distribution, they formerly spread over the whole world, and, as their relics testify, must have abounded in what is now the British area. Many of the Mesozoic cycads, notwithstanding the general resemblance of their leaves, differed essentially from the modern types, and where the reproductive organs have been preserved, as in specimens of Bennettites, the fossil fructification is found to be much more complicated than are the simple cones of the living cycads. In America, where abundant material has been discovered, Dr. Wieland, of Yale, has shown that the fructification of many cycad-like plants consisted of true bisexual flowers, comparable in general terms with those of such highly organised modern plants as the magnolias. Recent researches have, indeed, led to the conclusion that the origin of the angiosperms, which are to-day the dominant plants in the world, may perhaps be sought in those cycad-like plants that are so abundantly represented in the Wealden beds. If, as is probable, the flowers were brightly coloured, the fertilisation by insects may have begun among these cycads.

Not without some relation to the subject of the presidential address was a lecture by Mr. R. W. Hooley, of Southampton, on the Age of Reptiles in Hants and the Isle of Wight. The lecturer gave the results of much original investigation in the Wealden beds of the island, resulting in the discovery of many interesting remains. He held strongly to the view that the strata were of deltaic origin.

Another evening lecture was on the prehistoric memorials of Hampshire, by Mr. W. Dale, of Southampton. The lecturer, who is an active archæologist in the field, illustrated his discourse by some fine local antiquities in stone and bronze from his own collection, as well as by a large series of lantern-slides, including many original photographs.

Each morning during the congress two scientific papers were read; these related to botany, entomology, and geology, and most of them were appropriately of a local character. The afternoons were devoted to excursions, which were admirably organised by Mr. N. C. H. Nisbett; and in the evenings, before the lectures, here were receptions by the Mayor and by the headmaster of Winchester College. An excellent temporary museum was arranged at the Guildhall, under Mr. E. W. Swanton, of Sir Jonathan Hutchinson's Museum at Haslemere, the collections including a large series of interesting objects from the Hartley University College, Southampton. The success of the congress was largely due to the energy of the hon. local secretary, Mr. W. Norris, and the hon. general secretary, the Rev. R. Ashington Bullen.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

Cambridge.—Mr. H. F. Newall, F.R.S., fellow of Trinity College, has been elected to the recently founded professorship of astrophysics. Mr. Newall was formerly assistant to the Cavendish professor of physics and demonstrator in experimental physics in the same laboratory, and now holds the position of assistant director of the observatory at Cambridge.

H. E. Durham, King's College, has been approved by the general board of studies for the degree of Doctor in Science.

The general board of studies has appointed Dr. Haddon as reader in ethnology, and Dr. Bromwich as university lecturer in mathematics.

The same board has re-appointed S. Ruhemann as university lecturer in organic chemistry; Dr. Sell and Dr. Fenton as university lecturers in chemistry; Dr. Duckworth as university lecturer in physical anthropology; H. Woods as university lecturer in palæozoology; A. Harker as university lecturer in petrology; and T. S. P. Strangeways as Huddersfield lecturer in special pathology. All these re-appointments are for five years, and date from October 1, 1909. They have also all been confirmed by the special boards connected with the subjects mentioned.

The Vice-Chancellor, Dr. Ridgeway, W. Durnford, C. E. Grant, A. Gray, P. Giles, L. Whibley, and S. C. Cockerell have been nominated a syndicate to consider the administration of the Museum of Classical Archæology, the relation between that museum and the Fitzwilliam Museum, and, in particular, the appointment, duties, and powers of the curator of the Museum of Classical Archæology; the syndicate is empowered to confer with such bodies and persons as it may think fit, and is to report to the Senate before the end of the Lent term, 1910.

It is proposed, the Chancellor, as president of the University Association, having given his approval, that a sum of 1000*l.* from the unassigned portion of the benefaction fund be appropriated towards the cost of the erection of the first block of the new museum of archæology and ethnology, and that the Vice-Chancellor be authorised to accept a tender for the erection of block i. of the new museum of archæology and ethnology provided that the tender does not exceed the sum of 11,000*l.*, and that the sums subscribed or guaranteed amount to 12,500*l.* before any contract is signed.

Mr. Francis G. Smart, having made to the University an offer to give the sum of 600*l.* in order to found two prizes to be awarded in each year, one for botany and one for zoology, a Grace will be brought before the Senate

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to-day, June 17, recommending that Mr. Smart's offer be gratefully accepted.

The special board for divinity has nominated Dr. Humphry as assessor to the regius professor of physic for the ensuing year, and the special board for mathematics has nominated Sir Robert Ball as an elector to the Isaac Newton studentships until September 30, 1913.

The Cavendish professor of experimental physics announces that a course of demonstrations in practical physics will be given during the long vacation, beginning July 5.

The first three names in the Mathematical Tripos list, part i. (old regulations), are P. J. Daniell, Trinity; E. H. Neville, Trinity; and L. J. Mordell, St. John's.

DR. H. A. WILSON, F.R.S., professor of physics in King's College, London, has accepted the appointment of professor of physics in McGill University, Montreal.

THREE lectures on "Aëronautics" are being delivered at the East London College by Mr. A. P. Thurston. The first lecture, on Monday, June 14, was on flying machines (heavier-than-air type). The second, on Wednesday, June 23, will deal with balloons, airships, and kites, and the subject of the third, on Wednesday, June 30, will be the mechanical principles of flight. Applications for tickets of admission to the lectures should be sent to the registrar at the college.

THE Department of Agriculture and Technical Instruction for Ireland will in August next award not more than six industrial scholarships to persons engaged in industries, such as the woollen, linen, leather, and tanning industries. The object of these scholarships is to enable selected persons, who must already have been engaged in one of the higher branches of the industry, to take a full course of instruction in an institution providing special courses of an approved character with the view of training them for the management of such an industry. The scholarships will be tenable at some higher institution, to be approved by the Department, in which the industry, and the principles underlying it, are taught. They will be of the value of 80*l*. each, and may be renewed for a second or a third year at the discretion of the Department. Candidates must fill in and return, addressed to the secretary of the Department, not later than June 30, Form S. 192, copies of which may be had on application.

THE philanthropic aspects of the work of the administrators of the Children's Country Holidays Fund are appreciated and understood widely, but it is not generally known that, without some preliminary training, the ordinary town child is unable to benefit educationally from a short stay in the country. We are glad to learn, therefore, that a subcommittee, called the countryside committee, of the workers who organise the holidays was formed some time ago to develop means of interesting the children sent into the country in the natural wonders of countryside life. The subcommittee has arranged for the children, who will in August be sent by the fund into the country, a series of lantern lectures and nature talks about common animal and plant life, and also a succession of short rambles into metropolitan environs on Saturday afternoons to secure for them some preliminary practice in observation and general open-eyed intelligence. An appeal is made to competent men and women who love children to give, during the present month and the first weeks of July, nature talks to the children in the schools they attend, or to arrange for Saturday afternoon rambles in the immediate neighbourhood of London. Similar persons who live in the country and are willing to assist in making the fortnight's holiday a profitable time physically and mentally for the children are asked to communicate with the honorary secretary of the countryside committee, Mrs. Douglas Wilson, 17 Buckley Road, Brondesbury, London, N.W.

BEDFORD COLLEGE (University of London), the oldest university college for women, celebrates this year the sixtieth anniversary of its foundation. Since 1849, when it was first opened, its progress has been continuous, and the number of students entered this year exceeds three hundred. It is the only college exclusively for women which receives a Parliamentary grant. Recent developments in the work and the increase in numbers of students have caused serious pressure on the space available in the present buildings. In 1903 a building and endowment fund was started, which has received generous support; and the end of the lease of a Crown property in Regent's Park, known as South Villa, has been purchased, with a promise from the Crown for its renewal on a further lease of ninety-nine years. It is estimated that to erect on this site buildings well equipped for college purposes, including a library, laboratories, lecture-rooms, and a residence for students, will cost about 80,000*l*. The council of Bedford College, encouraged by the support it has already received (which includes a special bequest for a botanical laboratory), hopes that sufficient support may be forthcoming to enable it to obtain this sum, and to build a college in which the educational work so worthily begun may be carried on in worthy surroundings. In order to celebrate the sixtieth anniversary, and to make this desirable site known to their friends, the council and principal will hold a garden-party at South Villa on Tuesday, June 29, from 4 p.m. to 7 p.m., for which cards of invitation may be obtained from the secretary, Bedford College, York Place.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 10.—Sir Archibald Geikie, K.C.B., president, in the chair.—The functions of the pituitary body (Croonian lecture): Prof. E. A. **Schäfer**.—A wave-length comparator for standards of length: Dr. A. E. H. **Tutton**. Two and a half years ago the author was requested by the Standards Department of the Board of Trade to devise and superintend the construction of a new comparator, for comparing standards of length—the imperial standard yard, for instance, with official copies, and the latter with the copies constructed for local authorities—in terms of wave-lengths of light. The instrument now described is the result. Besides performing its functions as a wave-length comparator, and being the first instrument specifically constructed as such, it is also the most perfect instrument yet devised for measurement in wave-lengths in general. It is described to the Royal Society by permission of the President of the Board of Trade. The principle of the instrument is that of the author's interferometer, described to the society in 1898 in connection with an interference dilatometer, and again as improved in 1904 in connection with the author's elasmometer or interference elasticity apparatus. The interferometer, which is totally different from that of Michelson or that of Fabry and Perot, is adapted, as regards details, in a special manner for the specific object in view, but with the exception that a Hilger constant-deviation prism is employed instead of a train of two spectroscope prisms, its principle is preserved intact. The essential point of the instrument is that one of the two microscopes, employed to focus the two defining lines on a standard yard bar, actually carries just above the objective one of the two glass plates of the interference apparatus, which reflect the monochromatic light (hydrogen or cadmium red radiation) which is caused to interfere and produce rectilinear dark bands. When the microscope is moved the plate consequently moves with it, and the amount of movement is absolutely afforded by the movement of the interference bands, being equal to half the wave-length of the light employed for every band which passes the reference spot in the centre of the field of the interferometer telescope. So perfectly has this fine movement been achieved that the microscope and the bands can be caused to move simultaneously, by rotation of a large, fine-adjustment wheel, so steadily that each band can be made to pass the reference spot as slowly as one wishes, and be arrested instantly, without the slightest tremor, at any fraction of its width, so that the control of the bands and the counting is a perfectly simple matter. In order to compare two standard bars, it is only necessary (1) to place the bar of known length, supported on an elaborate mechanism for the adjustment of the bars, also novel, under the two microscopes, carried on massive yet deli-

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